Michigan Marsh Bird Survey Protocol

Reporting Office: Seney National Wildlife Refuge
Species: Multiple, including American Bittern (*Botaurus lentiginosus*), Yellow Rail (*Coturnicops noveboracensis*), Le Conte's Sparrow (*Ammodramus leconteii*), Sedge Wren (*Cistothorus platensis*)

JUSTIFICATION AND OBJECTIVES

The amount of emergent wetland habitat in North America has decreased sharply during the past century and populations of many marsh-dependent birds such as rails, bitterns, and grebes appear to be declining. Some species, including Yellow Rail, American Bittern and others, are of particular concern and have received special status through various federal and state agencies. In Michigan, Seney NWR is *an Important Bird Area* for a number of these species which receive *Resources of Concern* status in this document: American Bittern, Yellow Rail, Le Conte's Sparrow, and Sedge Wren.

In 2009, members of the Michigan Bird Conservation Initiative (MiBCI) began working with other State, regional, and National partners to develop a marsh bird survey in Michigan. The USFWS provided funding for a three-year effort to implement the National Marsh Bird Monitoring Program in Michigan in 2010. Goals were to 1) evaluate population trends for marsh bird species, 2) improve our understanding of marsh bird distribution and abundance, and 3) inform conservation decision-making at multiple geographic scales. Michigan's survey will provide data for an ongoing national pilot program. This pilot program is providing an opportunity to evaluate the sample design and methods of the national program, before it is expanded to a nationwide survey. We plan to continue this survey annually to allow long-term monitoring of marsh birds at the State, regional, and national levels.

Seney NWR participated in the national Secretive Marsh Bird Survey program, starting in the mid-2000s. Surveys were reinitiated based on the Michigan initiative in 2012.

STATISTICAL CONSIDERATIONS

Unknown.

DATA COLLECTION PROCEDURES

Data forms and instructions are provided yearly by Michigan Natural Features Inventory (MNFI), the organization leading the effort in Michigan. Twenty-three (23) survey points were randomly selected within wetlands at Seney using a national framework developed by the USFWS that incorporates National Wetlands Inventory and other land cover data. Other survey points are sampled on adjacent lands (and perhaps Seney NWR) by MNFI through a Special Use Permit.

Twenty-three (23) Michigan Marshbird Survey Points at Seney NWR (NAD83). Four (4) hegagons are sampled: Hex-01, Hex-05, Hex-17, Hex-48		
Point	**Latitude**	**Longitude**
Hex-01	46.29394764090	-86.12814588180
Hex-01	46.29049323470	-86.12990596780
Hex-01	46.28568494070	-86.15598567180
Hex-01	46.29032966510	-86.15740601310
Hex-01	46.28718799830	-86.14644268360
Hex-05	46.25593745730	-85.97261171280
Hex-05	46.25941419700	-85.97512154510
Hex-05	46.26584973200	-85.97825770910
Hex-05	46.29157768190	-85.97867225690
Hex-05	46.25843735420	-85.96613354930
Hex-05	46.28532298940	-85.99113939910
Hex-05	46.28579132200	-85.98010440250
Hex-17	46.28412924900	-85.94409113790
Hex-17	46.28813322600	-85.93916011000
Hex-17	46.27703215000	-85.93515498600
Hex-17	46.28320283880	-85.95175889290
Hex-17	46.28001425850	-85.93845725490
Hex-17	46.27522919420	-85.93967468770
Hex-48	46.34196639300	-86.22707486900
Hex-48	46.33387783710	-86.20451457680
Hex-48	46.33842966180	-86.22570265240
Hex-48	46.33712632820	-86.21668765540
Hex-48	46.33506466150	-86.21178265720

Timing of Surveys

Time of Year: Peak marsh bird calling activity occurs during the courtship and egg-laying period in spring and early summer. **Surveys at Seney NWR will be done between May 15 and June 30.**

Ideally, a complete round of annual surveys will consist of 3 visits to each point. Research suggests that at least 3 surveys are needed to confirm the presence/absence of some species with 90% certainty. However, if an observer can only conduct 2 surveys in a season, this is acceptable and the data will still have value. Volunteers will conduct a survey during each of 3 survey windows; **in northern Michigan surveys should be conducted during these 3 periods: May 15-31, June 1-14, and June 15-30.** Follow these guidelines as closely possible, but if you must modify the schedule slightly, doing so is better than not conducting a survey at all.

Time of Day: **Surveys may be done in either the morning or evening; however, once a time period is selected for a site (cluster of points), the time period cannot be changed.** Marsh birds are typically most vocal in the 2 hours surrounding sunrise and sunset. Morning surveys begin 30 min before sunrise (at first light) and should be completed by 3 hours after sunrise (e.g., 0500-0830 hr if sunrise at 0530 hr). Evening surveys begin 2 hrs before sunset and must be completed by 30 min after sunset (i.e., by dark – remember your headlamp or flashlight). Observers conducting field work in the evening should start their survey at a time that has them finishing the last point when it is becoming too dark to see their data form. You can look up local sunrise/sunset times at http://aa.usno.navy.mil/data/docs/RS_OneYear.php.

Suitable Weather Conditions

Surveys should not be conducted when wind speed is >12 mph or during periods of sustained rain or heavy fog. Participants should postpone surveys if they believe conditions are affecting bird calling activity or their ability to detect marsh birds. If wind speed increases above 12 mph or sustained rain begins during the survey, participants should stop the survey and repeat the entire survey route another day (i.e., do not just go back and survey the remaining points on the route). These constraints will require that you be flexible with your survey schedule and watch weather forecasts closely.

Target Species

Only the primary and secondary species listed below should be recorded on data sheets. Four-letter codes that can be used in data forms are below, and an "*"indicates species for which broadcasts will be played.

Primary species	Code	Secondary species	Code
Yellow Rail*	YERA	Black Tern	BLTE
Sora*	SORA	Forster's Tern	FOTE
Virginia Rail*	VIRA	Marsh Wren	MAWR
King Rail*	KIRA	Sedge Wren	SEWR
Least Bittern*	LEBI	Swamp Sparrow	SWSP
American Bittern*	AMBI	Le Conte's Sparrow	LCSP

American Coot	AMCO	Yellow-headed Blackbird	YHBL
Common Moorhen	COMO	Sandhill Crane	SACR
Pied-billed Grebe	PBGR		
Wilson's Snipe	WISN		

Field Survey Protocol

Each survey lasts for 10 min and consists of two parts: an initial 5-min passive listening period, and a subsequent 5-min broadcast period consisting of 5, 1-min segments of calls for secretive species. One-min broadcast segments consist of 30 sec of pre-recorded vocalizations and 30 sec of silence. In northern Michigan we will broadcast calls of Least Bittern, Yellow Rail, Sora, Virginia Rail, and American Bittern. Calls are broadcasted using an MP3 player and portable speaker set. **It is important that you DO NOT use other equipment for broadcasts, no matter how much louder other systems may be, as this will affect standardization of the survey.** Additionally, you should only use the provided call sequences and not play other audio files. We are using equipment and audio files that achieve the required sound pressure of 80-90 dB at 1 m from the speaker when broadcasted, so altering the equipment/audio files may prevent broadcasts from meeting this requirement. The broadcast player should be placed upright on the ground or on the bow of the boat. If the ground is wet or inundated, you should place the speaker on an object as close to the ground as possible (e.g., float cushion, muskrat house). Point the speaker toward the center of the wetland and DO NOT change its position during the survey. Speakers should be pointed in the same direction for all replicate surveys. In situations where the "center" of the wetland is not obvious, observers should record the general compass direction (e.g., N, NW, WSW, etc.) in which they pointed the speaker and use the same orientation in subsequent surveys. Observers should stand 2 m to one side of the speaker, because standing closer could reduce your ability to hear marsh birds. **All surveys should be conducted by a single observer. If more than one individual is present, only the primary observer should collect data.**

Primary Species: Each individual bird of a primary species that is detected will be entered on a separate line of the data form. Observers should record every 1-min segment during which the individual is detected (i.e., during any of the 1-min passive or call-broadcast segments). Do not record the number of times a bird responded during each segment; simply record if the individual was detected during each 1-min segment. These data are important in determining whether broadcasts are effective at eliciting additional responses and if broadcasts should be used in future surveys. By recording whether an individual responds during each 1-min segment, we can also estimate detection probabilities for primary species using capture-recapture models. Estimates of detection probability are essential to determining how well the survey data measure population sizes/trends. Observers must decide whether each vocalization heard at a survey point is a new individual for that point or an individual that was observed previously. Some points could have so many marsh birds calling that observers find it impossible to record each 1-min segment during which every individual bird is detected. For example, an observer may see/hear >20 American Coots at one survey point. In these situations, simply write down an estimate of the total number of individuals detected for that

species during the entire survey on one line of the data sheet (e.g., write “23 AMCO” on one line).

Observers need to estimate the distance from the survey point to each individual of a primary species to the nearest 5 m. Estimate the distance when a bird is first detected, because it may move closer after hearing broadcasted calls. Recording the distance to each individual will allow us to use distance sampling to better estimate bird densities. Estimating the distance to birds can be difficult, especially when they are only heard. We encourage you to practice estimating distances using objects of known distance or with the assistance of rangefinders and GPS units. You can also hang flagging at known distances near your survey points.

Secondary Species: All observations of a secondary species at a point should be combined into one row of the data form. You only need to record the total number observed in each of three distance categories (≤50 m, >50-100 m, and >100 m), which is based on the distance when each bird is FIRST detected. Unlike primary species, you DO NOT need to mark every minute that a secondary species is detected, but we ask you to mark the FIRST (and ONLY the first) 1-min segment in which you detect that species.

DATA ANALYSIS AND REPORTING

You can download the forms used for this survey via the Michigan Marsh Bird Survey webpage (http://www.mibci.org/index.php?id=233) for later printing, or you can obtain a supply of forms by contacting the survey coordinator (MNFI).

Bird Data

Below are details on how to fill out each part of the bird survey form. Note that we provided codes and descriptions for several data fields at the bottom of the data sheet to help you complete the form without the need to reference these instructions.

Date: Indicate the date of the survey. Use separate data sheets for different dates.
Site # and Name: Write the number and name assigned by the survey coordinator for your survey site. **This information will be provided with your maps and other materials each season.**

Survey #: Circle the appropriate survey period (first, second, or third) for the season.
Observer: Provide the name of the individual conducting the survey.

Point #: List the survey point number as assigned by the survey coordinator (e.g., X-0043).
Start Time: Please record the start time at each point using military time (e.g., 5:00 AM = 0500 hr; 5:00 PM = 1700 hr).

Temperature: Use a thermometer to determine the temperature (in ° F) at each survey point.
Cloud (%): Estimate % of the sky covered by clouds (0% = clear, 100% = overcast).
Precipitation: Using the codes on the data form, record the precipitation level as none, light rain, rain, heavy rain, light snow, snow, heavy snow, or fog. Remember that surveys should not be conducted during periods of steady precipitation or heavy fog.

Wind Speed: Categorize wind speed using the Beaufort scale .
Noise: Rank the background noise at each point using the following codes: 0 = no background noise during all or most of the survey; 1 = faint background noise during at least half of the survey; 2 = moderate background noise (probably cannot hear some birds beyond 100 m during >30 sec of the survey); 3 = loud background noise (probably cannot hear some birds beyond 50 m during >30 sec of the survey); and 4 = intense background noise (probably cannot hear some birds beyond 25 m during >30 sec of the survey).

Species: Record the full name of the species or the four-letter code provided above.
Responded During: Put a "1" in each column (i.e., 1-min segment) in which that individual is detected by vocalization and put an "S" in each column in which the individual is seen (including flyovers). If the individual is both heard and seen, put a "1S" in that column. For example, if a single Virginia Rail calls during minute 2 and then again in response to broadcasts during minute 9, then in the row used for that individual a "1" should be recorded in the columns "1-2 MIN" and "VIRA." If a new individual of the same or different species is also detected, record that observation on a separate row. If you observe a primary species before or after the 10-min survey period, or while walking between points, please record that observation in the "Outside Survey" column (with a "1" or "S") and add any pertinant notes in the comments section.

Call Types: For primary species, record the call type(s) you heard. This information can help us learn more about breeding chronology, observer bias, and detection probability. To make recording this information easier, we provided numerical codes to the most common call types on the data forms. If you hear a call different from those on the form, describe it in the comments sections. Brief descriptions of the common calls and their possible functions are provided below.

- American Bittern: *pump-er-lunk* (mate attraction, territorial), *chu-peep* (given during copulation ceremony), *kok-kok-kok* (given when flushed)
- American Coot: *burr-up* (perturbation), *hic-up* (perturbation), *honk* (social interactions)
- Least Bittern: *coo-coo* (mate attraction), *kak-kak-kak* (mate communication, when feeding young, alarm), *ank* or *ert* (given when flushed, alarm)
- Pied-billed Grebe: *owhoophyena* (courtship, pair communication territorial), (greeting)
- Sora: *whinny* (territorial, mate communication), *per-weep* (mate attraction), *keep* (alarm)
- Virginia Rail: *grunt* (mate communication), *tick-it* (mate attraction), *kicker* (solicitation), *squawk* (sharp call, territorial dispute, alarm call)
- Wilson's Snipe: *tuk-tuk-tuk* (harsh call usually given from ground), winnowing *hu-hu-hu* (hollow sound given during flight display), rasping *scaipe* (given when flushed)
- Yellow Rail: *click-click* (primary call, mate attraction), *descending cackle* (pair maintenance), *wheeze* (hostility)

Distance: For primary species, estimate the distance to the bird when it was FIRST detected (round to the nearest 5 m). If the bird is located more than 200 m from the survey point, write ">200" in this column.

Distance Aide: Use the codes on the data form to record any aides you used to estimate the distance to the bird (e.g., rangefinder, aerial photographs, flagging placed at known distance).

Direction: Mark a slash on the circle to indicate the direction you heard the individual bird. This column is optional and only for your personal use to help keep track of individuals when several of a single species are detected at a survey point.

Detected Previously: Indicate whether you detected the individual previously at another point by placing a "Y" (yes) or "N" (no) in the column. If you observed the bird previously, record the point number where the previous observation occurred in the comments section.
Secondary Species: Enter the total number of individuals you observed of a secondary species by distance category (≤50 m, >50-100 m, and >100 m) into the columns provided.

Comments: Provide any information that you think is relevant, such as: 1) total number of individuals for species that could not be tracked individually; 2) notation of a bird detected outside of the wetland being surveyed (e.g., American Bittern heard in a different wetland); 3) detection of a target marsh bird while walking between points; 4) point number at which a bird was detected previously; and 5) notation of a bird that only flew over the point.

Note: The number of lines filled out on the data sheet will differ among survey points and will depend on the total number of marsh birds detected at a point. If no marsh birds are detected at a survey point, record the point number, starting time, weather data, and background noise level, and then write "No birds" in the comments column. This will help you keep track of what survey point you are on and which ones you have completed.

Habitat Information (OPTIONAL)

Although recording habitat data is currently optional, we strongly encourage those observers that are comfortable assessing habitat variables to please do so. If you do not feel that you can accurately collect this information, please leave the form blank, because no data is better than erroneous data in this case. *However, at a minimum, we ask that you complete the "% Wetland" and "% Cover of Major Wetland Categories" sections.* Record the habitat data for each survey point on the habitat information form. These data will help scientists understand species-habitat relationships, make management/conservation decisions, and explain changes in marsh bird populations. **Because our priority is to complete bird surveys at all points, please assess the habitat at a time outside of your morning or evening bird survey window.** Record habitat information during each visit to your points, if possible, as habitat may change as the season progresses. All habitat data should pertain to the area within a 100-m radius of the survey point. Below are details on how to fill out each part of the habitat information form.

Date: Indicate the date of the habitat evaluation. Use separate data sheets for different dates.

Site # and Name: Write the number and name assigned by the survey coordinator for your survey site. This information will be provided with your maps and other materials.

Survey #: Circle the appropriate survey period (first, second, or third) for the season.

Observer: Provide the name of the individual evaluating the habitat.

Point #: List the survey point number as assigned by the survey coordinator (e.g., "X-0043").

% Wetland: Record the percent of the area within 100 m of the point that is wetland.

% Cover of Major Wetland Categories: Record the percent of the area within 100 m of the point made up by each of the seven wetland categories.

Dominant Emergent Plant Taxa: Record the three most dominant emergent plant taxa within 100 m of the point and the percent of the area made up by each taxa (e.g., 60% cattails). The three dominants may not add up to 100%. For example, the total will be less than 100% if there is open water or upland near the point. Conversely, the total could be greater than 100% if there are two or more layers of vegetation, such as pockets of common reed (*Phragmites australis*) growing above sedges (e.g., 85% sedges and 20% common reed).

Vegetation Density: Rank the overall density of the vegetation within 100 m of the survey point using the following four categories: 0 – none (no vegetation present); 1 – sparse (water easily visible through bases of widely scattered stems); 2 – moderate (anything falling between sparse and rank); or 3 – rank (water not visible through bases of stems; at water level and you cannot easily push your hand through the stems).

Vegetation Height: Estimate the average height of the dominant vegetation and record it as being in one of the following four categories: 0 – 1 m, 1 – 3 m, 3 – 6 m, or > 6 m.

Water Depth: Measure the water depth to the nearest centimeter using a meter stick. You can also measure water depth with a wooden dowel/plastic pipe by using a marker to graduate it in centimeters. These crude measuring devices also make handy walking sticks!

Litter Depth: If there is dead vegetation laying on the water or ground surface, measure the depth of this litter (from water/ground surface to the top of litter layer) to the nearest centimeter.

Comments: Record any pertinent notes about the habitat at the survey point (e.g., recent disturbance or management actions, changes in water levels, general description, etc.).

Once you complete your final survey, please mail your data and volunteer effort forms to:

> **Michael Monfils, Michigan Natural Features Inventory, MSU Extension, P.O. Box 30444, Lansing, MI 48909-7944.**

Forms should be sent to the above by **July 31**.

MANAGEMENT ACTION THRESHOLDS

None required at this time.

DATA STORAGE PROCEDURES

An electronic copy of all data (Excel file) should be kept at the refuge and updated yearly. Master files are maintained by MNFI.

SPECIAL CONSIDERATION

Equipment Provided to Observers

Survey coordinators will provide volunteers the following items:

- Survey site maps/aerial photographs
- MP3 player with audio files
- Portable speaker system
- Extra batteries
- Survey protocol (this document)
- Data forms (i.e., bird, habitat, and volunteer effort)

Other Recommended Equipment

Making sure you are prepared is a vital first step of field work. In addition to the above items, we have provided a list below of additional things you should have before starting surveys.

- Waterproof footwear: depending on the weather and point location, knee-high rubber boots, hip waders, or chest waders may be needed.
- GPS receiver: not required but extremely helpful in navigating to survey points. You can also load your point locations prior to beginning field work.
- Compass: GPS units break and batteries wear out – you should always have a compass.
- Cell phone (fully charged): for safety purposes (e.g., if you become injured or lost).
- Flagging tape: to mark your point locations and/or known distances.
- Binoculars.
- Rangefinder: laser rangefinders are optional, but are very helpful when estimating distances to marsh birds.
- Rain gear: often needed for both rainy days and dew-laden mornings.
- Flashlight/headlamp: may be needed to get into or out of your survey area in the dark.
- Thermometer: necessary to record the temperature at each point.
- Watch/clock: needed to record start times and stay within designated survey window.
- Clipboard and pencils.
- Food and water.
- Insect repellant.
- Field vest/backpack: to hold all your gear.
- Float cushion: used to hold broadcast equipment when surveying in standing water.

LITERATURE USED

Conway, C. J. 2009. Standardized North American Marsh Bird Monitoring Protocols, version 2009-1. Wildlife Research Report #2009-01. U.S. Geological Survey, Arizona Cooperative Fish and Wildlife Research Unit, Tucson, AZ.

U.S. Fish and Wildlife Service. 2009. Habitat monitoring protocol for marsh bird surveys, draft version 1.1.